What is claimed is:

1. A ferroelectric film that is described by a general formula $AB_{1-x}Nb_xO_3$,

wherein an A element includes at least Pb,

wherein a B element includes at least one of Zr, Ti, V, W, Hf and Ta, and

wherein Nb is included within the range of: $0.05 \leq x < 1$.

2. The ferroelectric film as defined by claim 1,

wherein the A element includes $Pb_{1-y}Ln_y$, and

wherein Ln includes at least one of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu, and y is within the range of: $0 < y \leq 0.2$.

3. A ferroelectric film that is described by a general formula$(Pb_{1-y}A_y)(B_{1-x}Nb_x)O_3$,

wherein an A element includes at least one of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu,

wherein a B element includes at least one of Zr, Ti, V, W, Hf and Ta, and

wherein Nb is included within the range of: $0.05 \leq x < 1$.

4. The ferroelectric film as defined by claim 1 or 3,

wherein Nb is included within the range of: $0.1 \leq x \leq 0.3$.

5. A PZT-family ferroelectric film,

wherein a Ti composition is greater than a Zr composition, and at least 2.5 mol% and not more than 40 mol% of the Ti composition is substituted by Nb.

6. The PZT-family ferroelectric film as defined by claim 5,

wherein at least 10 mol% and not more than 30 mol% of the Ti composition is substituted by Nb.

7. The PZT-family ferroelectric film as defined by claim 5, having a crystal structure of at least one of tetragonal and rhombohedral systems.

8. The PZT-family ferroelectric film as defined by claim 5, comprising:
Si, or Si and Ge of at least 0.5 mol%.

9. The PZT-family ferroelectric film as defined by claim 5, comprising:
Si, or Si and Ge of at least 0.5 mol% and less than 5 mol%.

10. A PZT-family ferroelectric film described by a general formula ABO_3,
wherein Pb is included as a constituent element in an A site and at least Zr and Ti are included as constituent elements in a B site, and amount of Pb vacancy in the A site is equal to or less than 20 mol% of the stoichiometric composition of the ABO_3.

11. The PZT-family ferroelectric film as defined by claim 10,
wherein Nb is included in the B site with a compositional ratio equivalent to twice the Pb vacancy in the A site.

12. The PZT-family ferroelectric film as defined by claim 10,
wherein a Ti composition is higher than a Zr composition in the B site, and also the ferroelectric film has a crystal structure of rhombohedral system.

13. The PZT-family ferroelectric film as defined by claim 5,
wherein the ferroelectric film is formed by using a sol-gel solution.

14. A method of manufacturing the ferroelectric film defined by claim 13,

wherein a mixture of at least a sol-gel solution for $PbZrO_3$, a sol-gel solution for $PbTiO_3$, and a sol-gel solution for $PbNbO_3$ is used as the sol-gel solution for forming the ferroelectric film.

15. The method of manufacturing the ferroelectric film as defined by claim 14,

wherein a sol-gel solution for forming $PbSiO_3$ is further mixed into the mixture to be used as the sol-gel solution for forming the ferroelectric film.

16. A method of manufacturing the ferroelectric film defined by any one of claims 10 to 12,

wherein when the stoichiometric composition of Pb that is a constituent element of the A site is assumed to be 1, the ferroelectric film is formed by using a sol-gel solution in which Pb is included within the range of 0.9 to 1.2.

17. The method of manufacturing the ferroelectric film as defined by claim 14 or 16,

wherein the PZT-family ferroelectric film is formed on a metal film formed of a platinum-group metal.

18. The method of manufacturing the ferroelectric film as defined by claim 17,

wherein the platinum-group metal is at least one of Pt and Ir.

19 A method of manufacturing a ferroelectric capacitor, the method comprising:

forming a lower electrode on a given substrate;

forming a ferroelectric film on the lower electrode, the ferroelectric film being formed of a PZTN complex oxide including Pb, Zr, Ti and Nb as constituent elements;

forming an upper electrode on the ferroelectric film;

forming a protective film so as to cover the lower electrode, ferroelectric film, and upper electrode; and

performing thermal processing for crystallizing the PZTN complex oxide, at least after forming the protective film.

20. The method of manufacturing a ferroelectric capacitor as defined by claim 19,

wherein preliminary thermal processing is performed on the ferroelectric film in an oxidizing atmosphere during the formation of the ferroelectric film, to put the PZTN complex oxide into an amorphous state until thermal processing for crystallizing the PZTN complex oxide is performed.

21. The method of manufacturing a ferroelectric capacitor as defined by claim 19,

wherein the protective film is a silicon dioxide film and is formed by using trimethylsilane.

22. The method of manufacturing a ferroelectric capacitor as defined by claim 19,

wherein the thermal processing for crystallizing the PZTN complex oxide is performed in a non-oxidizing atmosphere.

23. A ferroelectric capacitor manufactured by using the manufacture method as defined by any one of claims 19 to 22.

24. A ferroelectric memory manufactured by using the manufacture method as defined by any one of claims 1 to 13.

25. A piezoelectric element comprising the ferroelectric film as defined by any one of claims 1 to 13 or the ferroelectric capacitor as defined by claim 23.

26. A semiconductor element comprising the ferroelectric film as defined by any one of claims 1 to 13 or the ferroelectric capacitor as defined by claim 23.